The Runoff Homestead--A Working Example

By Daniel Howell

West Central New Mexico is a land of high elevation, short growing season, and limited rainfall. Modern conventional farming has thus far not proven to be sustainable in this area. Yet, for centuries, native peoples have successfully grown a variety of crops using only rainwater.

With neither well nor surface water, my wife, Karen, and I have established orchards and year-round gardens on our arid 40-acre homestead near Datil, New Mexico--elevation 7000 feet. In an area where annual precipitation averages 12 inches, our efforts have certainly supported ancient evidence that sustainable food production is very possible in this desert environment. In addition, our success has allowed us to create a more self-reliant lifestyle.

Farming in the desert with runoff requires a manageable watershed, a deep moisture-retaining soil, and at least 50-80mm of annual precipitation. It is also essential that the dryland farmer be aware of the frequency, intensity, and duration of local rains. The task, then, is simple: when the rains come, running water must be channeled to growing areas. And the ultimate goal is to build a moisture reserve in the soil of those growing areas that surpasses the evapotranspiration of the intended crops. This is usually accomplished by establishing terraced fields right in the watercourse, slowing the flow of the water and allowing it to percolate into the soil.

On our New Mexico homestead, my wife and I have experimented with a variety of methods for harvesting rainwater runoff. The systems we are employing can be built and maintained by hand--an important factor in our pursuit of self-reliance. What follows is a brief discussion of the methods we are using.

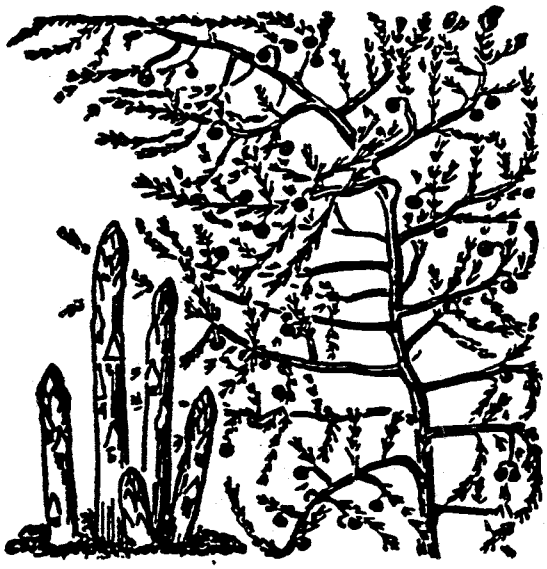
Our orchard, first of all, is one acre in size and contains 21 trees. Located on a slope of 5-10%, the trees are divided into microcatchments of various sizes. The holding depression area floods with 500 gallons of water, which is absorbed by the soil and stored in the root zone. In addition, the holes in which the trees were planted--6 feet in diameter, and 4 feet deep--were backfilled with compost and soil. In our clay soil, this arrangement creates a sponge effect; the higher porosity and humic content allow water to be held to a greater depth. Although the fruitfulness of the trees in this orchard has been hampered by late spring frosts, the trees have been established for four years now, and have shown normal growth.

With its extensive root system, asparagus is especially adapted to arid conditions, producing yields of superior quality and long duration. Our asparagus patch--to be highlighted in the next issue--is a traditional runoff terraced garden of 250 square feet. Irrigated by nothing but runoff water, it has produced 2 cuttings a year for the past 7 years.

All of our other gardens--totalling 750 square feet--are also wholly dependent on runoff, but receive most of it indirectly. Because most vegetable crops are too sensitive to moisture to survive without regular watering, we have ensured a constant supply of water by impounding runoff in earth dams. This captured water is then transferred to covered metal tanks--with a total capacity of 10,000 gallons--for storage. One flood provides enough stored water to garden from May to October. With this system, we have been able to harvest garden produce every month of the year without well water.

Our latest experiment involves a growing area of 150 square feet located at the bottom slope of one of the earth dams. It has been filled with 18 inches of alternating layers of weeds, sheet composted with sediment from the pond impounded by the dam. With the resultant higher humic content, the soil in this area wicks water from the ground beneath the dam and maintains a uniform moisture content. I'm confident that subsequent plantings will be successful.

Finally, water-efficient plant species further increase the chances of success for those who wish to become more self-reliant in the desert. There are many such species available, including barley, sorghum, sunflower, melons, beans, and amaranth. In addition, strains of squash, melons, maize, and beans grown for centuries by native peoples of the Southwest are available from Native Seeds/SEARCH (2509 N. Campbell Ave., #325, Tucson, AZ 85719).



Runoff Plant Selection

By Daniel Howell

In the runoff system we strive to mimic natural systems. Terraces, microcatchments, and contour furrowing techniques are designed to facilitate the infiltration and storage of moisture in the growing area. The bringing together of adapted species and runoff techniques can greatly increase the productivity of food, forage, and fiber crops on drylands worldwide.

Generally speaking, plants capable of withstanding the wet/dry cycles of runoff farming do so by utilizing three basic strategies, either singly or in combination: avoidance, persistence, and dormancy.

Avoidance mechanisms are employed by fast growing annuals which complete their life cycle in a few weeks. They reach maturity and disperse their seeds, and in that state (the seed) they avoid the harsh conditions. In unfavorable years avoiders will not germinate.

Dryland adapted persisters survive in one of two ways: they have spreading, shallow roots and the ability to store water (like cacti), or are deeply rooted plants (like mesquite and juniper). Persisters are visible season after season and are the most conspicuous plants of the drylands.

The dormancy strategy is used by plants which are inactive during the adverse periods and remain safely buried awaiting the next cycle of growth. Dormancy cycles are based on moisture and temperature extremes.

Using these categories, an inspection can be made of plants' characteristics, taking into consideration center of origin (climactic type) and specific cultivation practices (particular species adapted to certain purposes, i.e., Hopi corn). This procedure should help in selection by pointing out plants which cannot survive the wet/dry cycles of runoff farming.

Here are some of the plants (by category) we have grown successfully using runoff.

Avoidance: amaranth, kochia, sunflowers, orach, spinach, and pinto beans.

Persistence: apple, apricot, sweet and sour cherries, plums, peaches, and pears.

Dormancy: Egyptian onion, asparagus, Jerusalem artichokes, and garlic.

With the proper consideration given to appropriate runoff techniques and climate, an even greater variety of plants are possible.

LET THE DESERTS BLOOM.

The Runoff Homestead's Asparagus Patch

By Daniel Howell

My wife Karen and I have built a runoff farm at 7000 feet elevation, where we harvest garden-fresh vegetables year round without a well or surface water. We solely utilize surface runoff.

When we arrived here from Los Angeles in 1977, our land had no road to it or fence around it and had been overgrazed for years. There were several gullies and it was marked with sheet erosion.

But we had a plan. We selected an area of our property for our first runoff experiment. It was a small gully about two feet deep and four to five feet wide, with deep soil capable of retaining moisture. This site collected runoff from about two acres, which we considered a manageable watershed.

Across the gully we built a check dam--10 feet long and perpendicular to the flow of water--and tied it into the higher ground on both sides. We used rock without mortar to lay up a terrace wall, raised about 10 inches above the level of the watercourse. When it was completed, we leveled a garden space 25 feet uphill from the wall. This distance was determined by the height of the check dam and the slope of the surrounding ground. We stabilized that section of the gully so that subsequent runoff would be slowed, allowing soil infiltration.

We decided to try asparagus as our first crop. Our research indicated that it had evolved in the Southwestern Asian steppe under conditions similar to our own. We planted two-year-old crowns of Martha Washington in six rows, four feet apart. We watered them initially with runoff from our roof which we collected in barrels. We gave each plant a bucket of water a week, filling in the trenches as the sprouts grew taller.

In the fall we chopped down the old growth and weeded, then overwintered the rows with thick mulch. We did not cut any spears that year and no longer watered them. They were on their own now.

In the following years we have had a lot of asparagus. Spring growth starts with moisture received during overwintering (snow and late fall runoff). We allow each plant to grow one tall frond. We cut and eat all the other shoots, many the size of a man's thumb.

During May and June the asparagus has used up its moisture reserves and normally stops sending out new shoots. It needs a rest which allows top growth to proceed, providing energy for the roots. With the coming of the summer rains and the first flood, the moisture is recharged and the spears appear again, usually until frost.

In all, we get two cutting periods of six to eight weeks, each averaging one pound a day from our 25 plants--almost a hundred pounds a year. Spring, 1988 marks our ninth season of quality asparagus production without us watering them.